

# **On the Dual Material/Electrochemical Approach for Elaborating Better Electrodes/Batteries**

***J.-M. Tarascon***

Laboratoire de Réactivité et Chimie des  
Solides, Université de Picardie Jules Verne,  
33 rue Saint Leu, 80090, Amiens, France  
e-mail: jean-marie.tarascon@sc.u-  
picardie.fr

## **Abstract**

The performance of a Li-based battery, namely its capacity (Ah/g), its voltage (V) and therefore its energy density is related to the intrinsic property of the positive and negative electrode materials. Thus, the importance of improving already existing materials or designing new ones as will be discussed through a few examples dealing either with metal-oxides or other compounds. While the capacity of a cell is nested in its electrode structural/electronic behaviour, poor cell lifetime is mainly rooted in the critical phase of any electrochemical system: the interface. Tackling interfacial issues is both tedious and complex because of the limited number of techniques able to locally probe the evolution of the electrode/electrolyte interface. Besides, the GITT, PITT or AC-impedance measurements, we have so far mostly relied on post-mortem rather than in situ studies to determine how the interface ages with time either under cycling or storage conditions, thus missing key information. However, as it will be illustrated through descriptive studies of interfaces selected among the oxide/electrolyte or Li/electrolyte ones, new opportunities have arisen.

